

Graphing Planes in Three-Space

$$Ax + By + Cz = D$$

If you have 2 variables the graph is a line

3 variables the graph is a plane

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Example

$$2x + 2y + z = 8$$

Handwritten solutions for $2x + 2y + z = 8$ are shown, with some points circled in green:

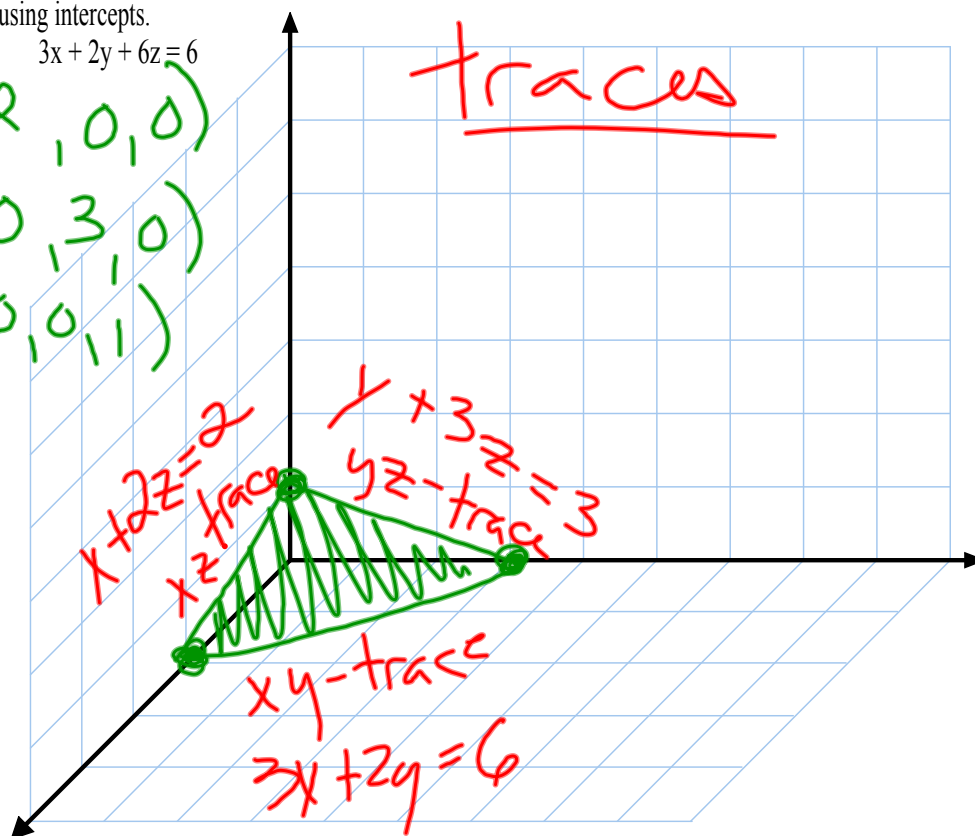
| | | |
|---------|---------|---------|
| 4, 0, 0 | 2, 0, 4 | 0, 2, 4 |
| 2, 2, 0 | 3, 1, 0 | 0, 4, 0 |
| 1, 1, 4 | 0, 0, 8 | |

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Graph using intercepts.

ex: $3x + 2y + 6z = 6$

$(2, 0, 0)$
 $(0, 3, 0)$
 $(0, 0, 1)$

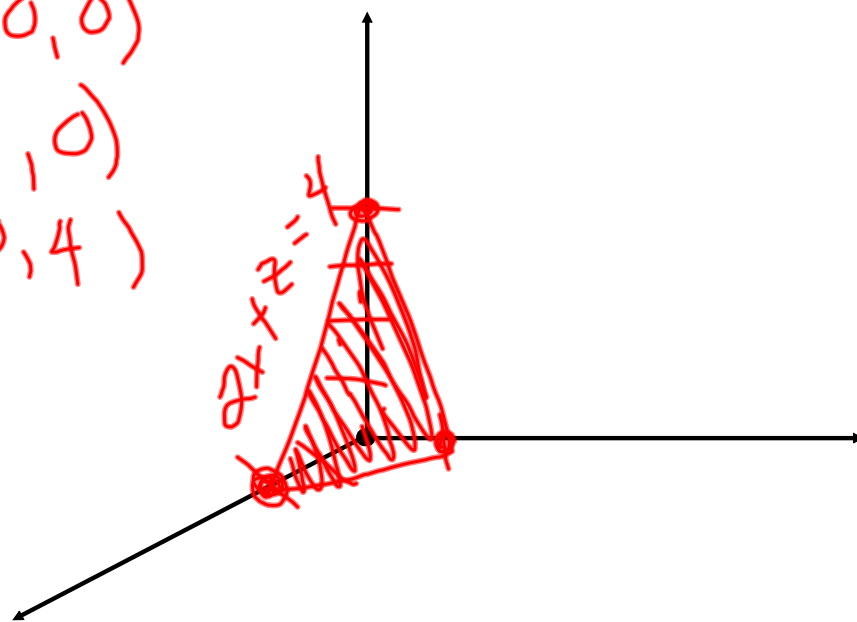


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Ex:

$$2x + 4y + z = 4$$

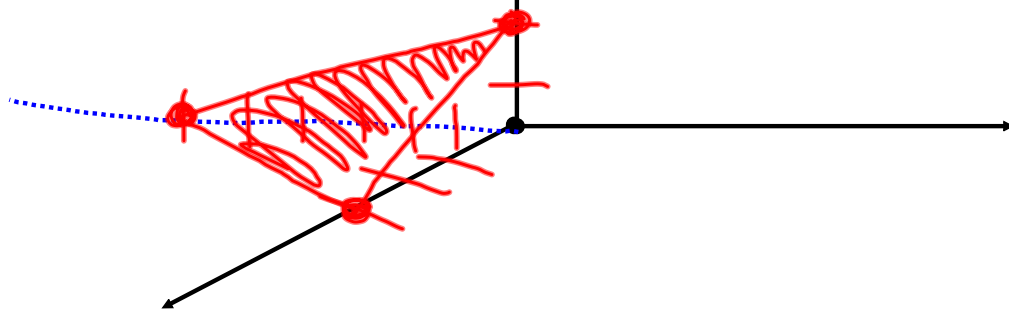
$(2, 0, 0)$
 $(0, 1, 0)$
 $(0, 0, 4)$



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Ex: $2x - y + 3z = 6$

$$\begin{pmatrix} 3, 0, 0 \\ 0, -6, 0 \\ 0, 0, 2 \end{pmatrix}$$



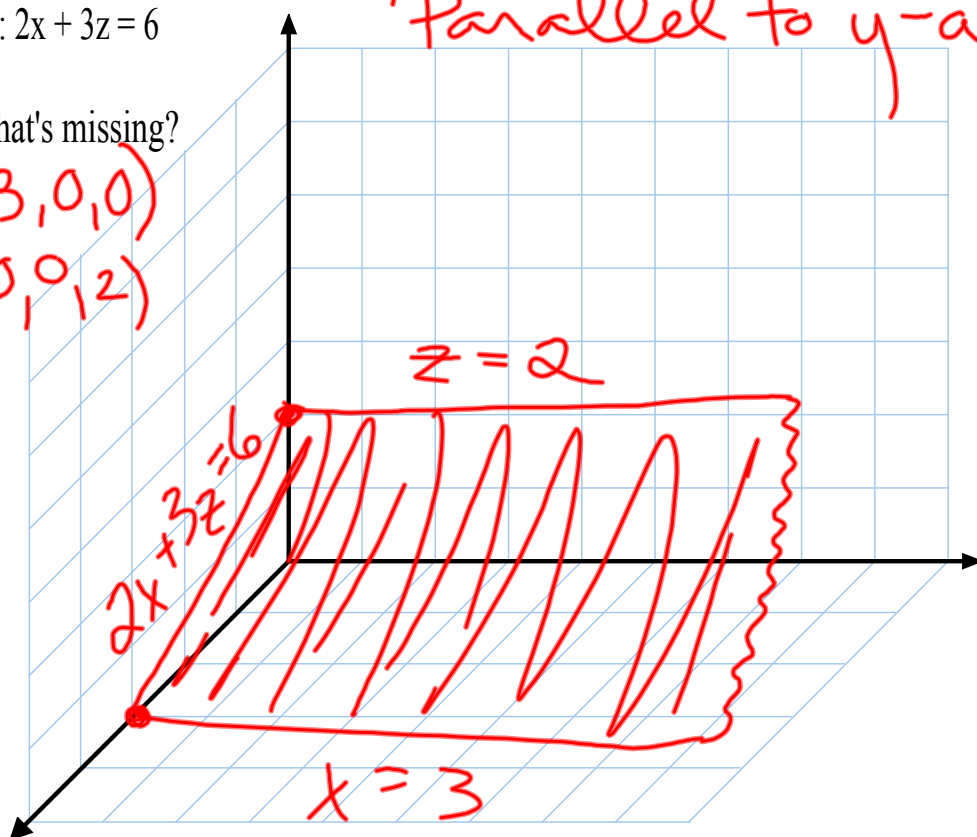
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Ex: $2x + 3z = 6$

What's missing?

$$\begin{pmatrix} 3, 0, 0 \\ 0, 0, 2 \end{pmatrix}$$

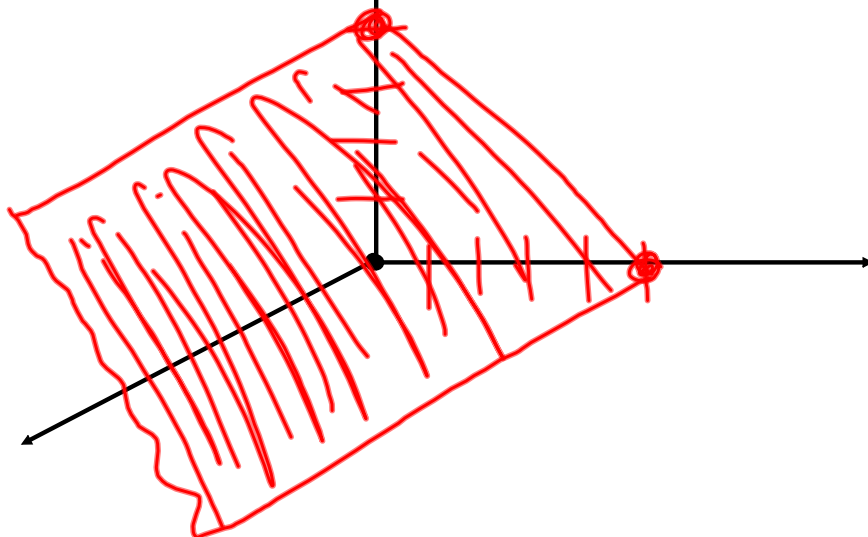
Parallel to y-axis



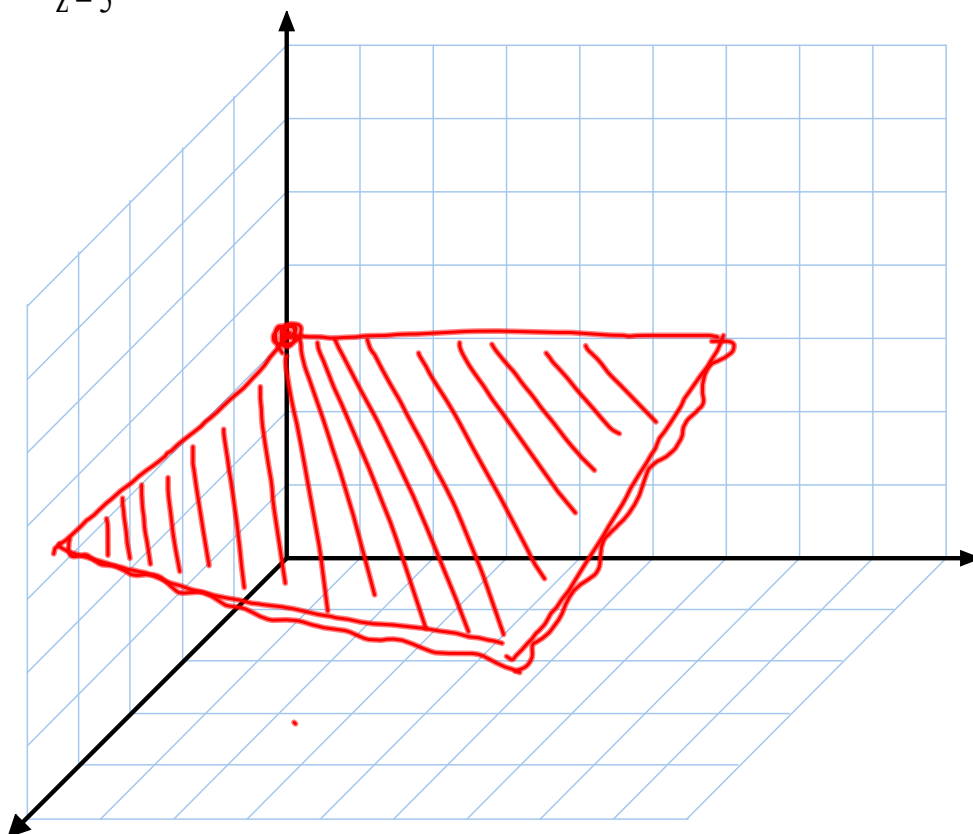
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Ex: $4y + 5z = 20$

$$\begin{cases} (0, 5, 0) \\ (0, 0, 4) \end{cases}$$



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Ex: $z = 3$ 

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